

9-11-90
12.380.5



KLEIN CONSULTING ENGINEERS, INC.

Civil Engineers/Planners/Surveyors

P. O. BOX 808

1928 Council Street Forest Grove, OR 97116

503 / 359-5956

September 11, 1990

Smith & Monroe & Gray Engineers, Inc.
Park Plaza West, Suite 210
10700 S.W. Beaverton Hwy.
Beaverton, Oregon 97005

Attn: Steve Rinella

Re: Ash Grove Drainage

Dear Steve:

The following briefly summarizes our findings relative to the above subject project.

Based on pond settling tests performed by Nate Fernow (Ash Grove Cement West, Inc., Seattle) an approximation of the relationship between pond water level and percolation outflow was made. Because the pond level was only raised 1.3 feet above the normal summertime level (approximately 3.5' MSL), it is evident that this relationship directly applies to 20% of the pond depth range; outflows for water levels between 5' and 10' MSL are based on values predicted by Darcy's Law and have not been field-verified.

Please note that the soils in this area are not well-suited for drywell application. While the percolation test performed by Ash Grove developed some useful information, it is by no means a definitive indication of pond outflow performance. The fact that the pond has overflowed recently indicates that the percolation rate predicted by theory may actually be much lower in reality. If the recent de-watering tests performed by your geotechnical engineers can provide further information, we recommend securing these results, although better information could be developed through continuous monitoring of pond water levels.

Our analysis of existing site drainage characteristics was modified slightly to account for observations found in a report prepared by Meriwether Leachman Associates, Inc. (MLA) in 1989 for the Washington Department Ecology discharge permit application/renewal. Existing on-site runoff flows to the pond as determined by our analysis were nearly identical to those

USEPA SF



1261574

CIVIL • SANITARY • MUNICIPAL • STUDIES • INVESTIGATIONS • REPORTS

Affiliated with Consulting Engineers Council American Society of Civil Engineers American Water Works Assn

AGC2H000108

predicted by MLA. However, a few important discrepancies were also noted, which will be elaborated on later in this letter.

In order to maintain consistency with information developed relative to the DOE permit, we have assumed, that, as a minimum, the existing storage available in the pond should be maintained in the proposed drywell. The following criteria were used:

Minimum Depth Available for Storage (winter). 4.5 MSL
Maximum Depth Available for Storage 10.0 MSL
Maximum Pond Volume Available (winter). 86,000 cu. ft.
Porosity of Proposed Drywell Rockfill 30%

Using this criteria, it was found that the minimum area of a proposed drywell facility required, to contain the existing pond volume was 52,120 square feet (approximately 230' x 230'). This area may prove to be larger than that available in the proposed site plan. Further storage can be obtained by placing lengths of perforated corrugated steel pipe arch horizontally in the drywell. (55" x 75" pipe arch provides 15.3 cubic feet of storage per lineal foot of pipe for each lineal foot of drywell drain rock displaced). If you wish, we can send over a sketch which shows one possible layout alternative (82,000 cu. ft. of drywell storage plus 4,000 cu. ft. of pipe storage) employing 265 LF of pipe arch in a 50,000 square foot drywell.

As noted above, the drywell dimensions shown are those necessary to contain the existing pond volume. As the pond has overflowed at least twice in the past two years (according to Nate Fernow) it is possible that drainage would back up again in the future.

After reviewing the proposed development plan, it appears unlikely that additional capacity required to store the post-development runoff can be obtained through drywell storage. Please note that the MLA plan outlining drainage flow (attached) indicates that the central facility area drainage currently does not appear as runoff due to "subsurface seepage and evaporation". However, in the proposed site plan, ditches and area drains will serve this area, which will contain a significant amount of impervious surfaces. Additionally, the Class "D" Soils (SCS Classification) of this area identified by MLA generally exhibit poor drainage capability. As this area encompasses approximately 8 acres, the additional impact of the post-development runoff on the collection system outlined above would provide marginal storage capacity for the existing runoff; additional storage required to handle the developed flows would have to be contained upstream in oversized pipes, ditches, etc. Nate Fernow mentioned the possibility of storing water at some additional location on-site. This is an alternative that may be combined with

Smith & Monroe & Gray Engineers, Inc.
Page 3

upstream storage within the conveyance system to possibly handle the additional site drainage.

If you feel that the area required to convert the existing pond to drywell storage can be incorporated into the proposed site plan, we can investigate additional upstream detention requirements at your request. It would be helpful to obtain drawings showing dimensions of proposed structures/roads/etc. for this purpose, as the drawings in our possession are not very readable.

Please get back to us with your comments and evaluation relative to this letter, and we will proceed as necessary.

Sincerely,

KLEIN CONSULTING ENGINEERS, INC.

A handwritten signature in dark ink, appearing to read "Dan Keppen", with a long horizontal flourish extending to the right.

Dan Keppen

DK:rw